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Medical faculty perception toward digital teaching methods during COVID-19 pandemic: Experience from India

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Abstract:

BACKGROUND: Videoconferencing has been used as a modality of online medical teaching by various institutes. There is a paucity of studies reporting the perception of medical teachers toward teaching using teleconferencing platforms. The objective of this survey was to evaluate the perception of medical teachers toward teaching using videoconferencing platforms such as Zoom meet, Google meet, and Google classroom during the COVID-19 pandemic. Our hypothesis was teaching faculty would have a positive perception and experience toward web-based teaching modalities.

MATERIALS AND METHODS: Medical teachers of a medical college were invited to participate in a prospective observational cross-sectional online survey. The faculty demographic information, perception, experience, and satisfaction were noted. Perception data were presented as proportion and percentage.

RESULTS: 104 out of 160 faculty members participated in the study (response rate = 65%). 61 male (58.7%) and 43 female (41.3%) faculty members participated in the study. The mean age of the faculty members was 39.3 years ± 13 (range: 27–69 years). Laptop (n = 73 [70.2%]) was the most commonly used electronic device by the faculty members for conducting e-teaching sessions followed by smartphone (n = 25 [24%]). Google meet was the most preferred videoconference tool for online teaching. Ninety-six faculties (92.2%) were satisfied with the e-teaching method adopted by the institute. Eighty-three faculty (79.8%) perceived the e-teaching method to be very useful and quite useful as a modality for teaching during the lockdown period.

CONCLUSIONS: The teaching faculties had a positive perception toward digital education methods adopted for teaching of undergraduate medical students at our institute.

Keywords:

COVID-19, cross sectional survey, faculty, medical, videoconferencing

Introduction

The COVID-19 pandemic has led to a sudden void in the field of medical education due to the cancellation of traditional classroom teaching and bedside clinical teaching of medical students.[1,2] Due to the closure of medical college campuses, there was a need to turn to alternative methods of teaching and online teaching using videoconference tools such as Zoom meet and Google meet remains one such modality.[3-5]

Most of the papers have been the authors' expert opinions about strategies to cope with medical education during the COVID-19 crisis, and there is a paucity of original research papers on the perception of medical teachers toward videoconference tools during the present pandemic.

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In India, teleconferencing was used as a modality for education at the Sanjay Gandhi Postgraduate Institute of Medical Sciences at Lucknow from 2001.[6] Telemedicine has also been used to educate doctors from remotely located hospitals in the sub-specialty of neurology.[7] Telemedicine facility using videoconference has been used for distance education of trainee doctors in endocrine surgery[6] and radiation oncology[8] in Northern India. However, both studies were pertaining to postgraduate trainees in a particular sub-specialty, and feedback of faculty members was not reported separately. Videoconferencing and direct contact programs have been used successfully by a premier institute in South India for training doctors in a family medicine diploma course.[9] Authors from India have highlighted the importance of videoconferencing tools as an adjunct to traditional methods in the specialties of obstetrics and gynecology[10] and psychiatry.[11] The feedback of medical students to online teaching during COVID-19 has been reported in a study,[12] but the study did not include information on the perception of medical teachers to online teaching.

Videoconferencing has been used as a modality of online medical teaching by various institutes. However, there are no studies that have described the perception of the medical teachers toward online teaching methods during the COVID-19 pandemic. Hence, the objective of this survey was to evaluate the perception of medical teachers toward teaching using videoconferencing platforms such as Zoom meet, Google meet, and Google classroom.

Materials and Methods

This prospective, cross-sectional observational survey was conducted after obtaining approval from the Institutional Ethics committee of the Institute.

Our medical college is located in a rural area of India. Every year there is an intake of 150 undergraduate medical students for the MBBS course. Our Institute took the initiative to implement video conferencing platforms such as Zoom Meet (www.zoom.us; San Jose, CA, USA) and Google Meet for teaching and training of undergraduate medical students. The training was conducted for all the faculty members and then, they were encouraged to use both the platforms for teaching the medical students. During the lockdown period, the feedback was obtained from the faculty members of the institute.

Faculty members who took lectures for the students using an interactive platform such as the Zoom meeting or Google meet and gave voluntary informed consent for participating in the study were included in the survey. Faculty members who did not take a single session of the e-teaching session and those not giving consent for study participation were excluded.

We took feedback from all the faculty members who fulfilled the inclusion criteria; hence, no specific sampling method was utilized.

To gain maximum participation, information regarding the study including posters and flyers was posted on various WhatsApp groups of the faculty members of the institute and E-mails were sent to all faculty members to improve their awareness about the study regarding their feedback, perception, experience, and satisfaction of the e-learning sessions organized during the lockdown period.

The online teaching using the videoconferencing platform commenced at our Institute from March 17, 2020. Survey response was collected using Google forms from May 6, 2020 to May 20, 2020.

The faculty demographic information, perception, experience, and satisfaction were assessed using a questionnaire designed by the researchers based on the methodology followed by previous researchers [13-15] [Table 1].

Demographic data pertaining to age was presented as mean, standard deviation, and range, whereas gender, specialty department, designation, feedback of faculty on delivering online lectures, and feedback on videoconference platform for conducting online lectures were presented as proportion and percentage.

Results

One hundred and four out of 160 faculty members participated in the study (response rate = 65%). Sixty one male (58.7%) and 43 female (41.3%) faculty members participated in the study. The mean age of the faculty members was 39.3 years ± 13 (range: 27–69 years). The participation was from the departments of Anatomy (n = 6 [5.8%]), Biochemistry (n = 6 [5.8%]), Physiology (n = 5 [4.8%]), Forensic medicine (n = 1 [1%]), Microbiology (n = 5 [4.8%]), Pathology (n = 9 [8.7%]), Pharmacology (n = 6 [5.8%]), Medicine (n = 8 [7.7%]), Community medicine (n = 6 [5.8%]), Obstetrics and Gynaecology (n = 6 [5.8%]), Paediatrics (n = 6 [5.8%]), Surgery (n = 5 [4.8%]), Anaesthesiology (n = 5 [4.8%]), Dermatology and Venereology (n = 1 [1%]), Otorhinolaryngology (n = 5 [4.8%]), Ophthalmology (n = 4 [3.8%]), Orthopaedics (n = 11 [10.6%]), Psychiatry (n = 2 [1.9%]), Pulmonary medicine (n = 2 [1.9%]) and Radiology (n = 5 [4.8%]). The designation of the participating faculty was: Professor (n = 21 [20.2%]),

Table 1: Survey questions for faculty

Age: _____
Gender: _____
Speciality: _____
Designation (professor/associate professor/assistant professor/senior resident/tutors)
Feedback on delivering online lectures
Which device did you use to take the lecture on Zoom Meet/Google Meet/Google classroom?
Smart phone
Tablet
Laptop
Desktop
From where did you conduct the Zoom Meet/Google Meet?
Home
Institute
Other
How many lecture sessions have you conducted using Zoom Meet/Google Meet?
1
2
3
4
5
6 or more
Did you face any issue with internet connection?
No
Yes
Feedback on videoconference platform for conducting online lectures
How did you find Google classroom as a repository for uploading class lecture material?
Extremely useful
Quite useful
Somewhat useful
Not so useful
Not at all useful
Compared to conventional teaching method, how would you rate your overall experience with Zoom Meet/Google Meet/Google classroom?
Outstanding
Excellent
Average
Fair
Poor
How would you rate your satisfaction with using Zoom Meet/Google Meet/Google classroom as a tool for imparting medical education?
Extremely satisfied
Quite satisfied
Somewhat satisfied
Not so satisfied
Not at all satisfied
How do you rate the utility of Zoom Meet/Google Meet classes during the lockdown period?
Very useful
Quite useful
Useful
Rarely useful
Not useful
You might have spoken to your friends in other medical colleges. How do you rate the utilization of E-learning using Zoom Meet/Google Meet/ Google classroom at our Institute?
Outstanding
Excellent
Average
Fair

Contd...

Table 1: Contd...

Poor
What are the advantages/disadvantages of learning using Zoom class/Google classroom? Answer each option with a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)
More efficient use of study time
Internet connection is slow/interrupted
Difficulty in taking attendance
Proxy attendance by students
Disturbance by students (drawing and making annotations)
Unable to find the student causing disruption in the class
Students keep on entering the class as they like. Lack of punctuality
What is your preferred E-teaching method?
Zoom Meet
Google Meet/Google Hangout
Google classroom

Associate Professor (n = 17 [16.3%]), Assistant Professor (n = 42 [40.4%]), Tutor (n = 11 [10.6%]), senior resident (n = 12 [11.5%]), and junior resident (n = 1 [1%]).

Laptop (n = 73 [70.2%]) was the most commonly used electronic device by the faculty members for conducting online teaching sessions followed by smart phone (n = 25 [24%]), desktop (n = 4 [3.8%]), use of smartphone and laptop (n = 1 [1%]), and tablet (n = 1 [1%]). Majority of the e-lectures taken by the faculty (n = 77 [74%]) were from their home, followed by the office in the institute (n = 23 [22.1%]) and at both home and the office (n = 4 [3.8%]). Majority of the faculty (n = 61 [58.7%]) had conducted six or more than six e-teaching sessions. Fifteen faculties (14.4%), eight faculties (7.7%), one faculty (1%), 11 faculties (10.6%), and eight faculties (7.7%) had conducted one, two, three, four and five e-lectures, respectively. Majority of the faculties (n = 54 [51.9%]) did not face any issue with Internet connection during the e-teaching sessions. Detailed response of the faculties' perception is provided in Table 2.

Google meet was the most preferred videoconference tool for online teaching by 56 medical teachers (53.8%). Zoom meet was the preferred modality for 31 medical teachers (29.8%) and Google classroom was the preferred modality for 17 faculties (16.3%). Eighty-nine faculty members (85.5%) found Google classroom to be extremely useful and quite useful as a repository for uploading class lecture material. Forty-two faculties (40.3%) perceived e-teaching to be better compared to traditional methods, whereas 52 faculties (50%) perceived the e-teaching method to be average compared to traditional methods. Ninety-six faculties (92.2%) were satisfied with the online teaching method adopted by the institute. Fifty-three faculties (50.9%) were extremely satisfied and quite satisfied with e-teaching method at the institute. Eighty-three faculties (79.8%) perceived the online teaching method to be very useful and quite useful as a modality for teaching during wthe lockdown period. Ninety-two faculties (88.4%) perceived that e-teaching method was more effectively used at our institute compared to other institutes. Fifty-four faculties (52%) perceived that e-teaching method facilitated the efficient use of study time. Forty-one faculties (39.4%) perceived difficulty in taking attendance during e-teaching method. Sixty-one faculties (58.7%) perceived that students were resorting to unfair means during class attendance in e-teaching method. Forty-seven faculties (45.2%) perceived that students were causing disturbance to class by making annotations on screen. Fifty-three faculties (50.9%) perceived difficulty in identifying the student (s), causing the disturbance in the class during e-teaching method. Seventy-three faculties (70.2%) perceived lack of punctuality of students during e-teaching method.

Discussion

Medical teachers had a positive perception toward online videoconferencing platforms such as Zoom meet and Google meet during the COVID-19 pandemic.

The challenging economic condition posed by the COVID-19 pandemic is likely to have far-reaching adverse financial implications on medical colleges and other teaching institutes.[16,17] An economic slowdown can have an impact on students' abilities to pay their educational fees and consequently institutes abilities to pay salaries to their faculty members. All this can have consequence on teaching activities undertaken by the Institute. Furthermore, limited broadband bandwith can affect the quality of lectures and videos shown by the teaching faculty. The economic slowdown imposed by the COVID-19 pandemic can affect the abilities of the Institutes to invest in optical fibers to improve the bandwith.

Table 2: Faculty feedback

Question	*n* (%)				
	Response 1	Response 2	Response 3	Response 4	Response 5
How did you find Google classroom as a repository for uploading class lecture material?	Extremely useful - 33 (31.7)	Quite useful - 56 (53.8)	Somewhat useful - 12 (11.5)	Not so useful - 3 (2.9)	Not at all useful - 0
Compared to conventional teaching method, how would you rate your overall experience with Zoom Meet/Google Meet/Google classroom	Outstanding - 4 (3.8)	Excellent - 38 (36.5)	Average - 52 (50)	Fair - 7 (6.7)	Poor - 3 (2.9)
How would you rate your satisfaction with using Zoom Meet/Google Meet/Google classroom as a tool for receiving medical education	Extremely satisfied - 7 (6.7)	Quite satisfied - 46 (44.2)	Somewhat satisfied - 43 (41.3)	Not so satisfied - 6 (5.8)	Not at all satisfied - 2 (1.9)
How do you rate the utility of online teaching using Zoom Meet/ Google Meet/Google class room during the lockdown period	Very useful - 44 (42.3)	Quite useful - 39 (37.5)	Useful - 21 (20.2)	Rarely useful - 0	Not useful - 0
You might have spoken to your friends in other medical colleges. How do you rate the utilization of online teaching using Zoom Meet/ Google Meet	Outstanding - 30 (28.8)	Excellent - 62 (59.6)	Average - 12 (11.5)	Fair - 0	Poor - 0
Perceived advantages (more efficient use of study time)	Strongly agree - 9 (8.7)	Agree - 45 (43.3)	Neither agree nor disagree - 36 (34.6)	Disagree - 8 (7.7)	Strongly disagree - 6 (5.8)
Perceived disadvantage (difficulty in taking attendance)	Strongly agree - 7 (6.7)	Agree - 34 (32.7)	Neither agree nor disagree - 31 (29.8)	Disagree - 28 (26.9)	Strongly disagree - 4 (3.8)
Perceived disadvantage (proxy attendance by students)	Strongly agree - 21 (20.2)	Agree - 40 (38.5)	Neither agree nor disagree - 24 (23.1)	Disagree - 13 (12.5)	Strongly disagree - 6 (5.8)
Perceived disadvantage (disturbance by students by making annotations)	Strongly agree - 11 (10.6)	Agree - 36 (34.6)	Neither agree nor disagree - 18 (17.3)	Disagree - 31 (29.8)	Strongly disagree - 8 (7.7)
Perceived disadvantage (unable to find the student causing disruption during the E-lecture)	Strongly agree - 15 (14.4)	Agree - 38 (36.5)	Neither agree nor disagree - 23 (22.1)	Disagree - 20 (19.2)	Strongly disagree - 8 (7.7)
Perceived disadvantage (lack of punctuality of students)	Strongly agree - 29 (27.9)	Agree - 44 (42.3)	Neither agree nor disagree - 17 (16.3)	Disagree - 9 (8.7)	Strongly disagree - 5 (4.8)

Comparison with other studies

We used a combination of broadband internet and third-generation (3G) and 4G mobile phone technology for delivering medical education using videoconference to our medical undergraduate students. This study includes a survey of medical teachers of an Indian medical college from all preclinical, paraclinical, and clinical specialties.

One small survey has described the experience of a single tutor and 16 students to e-tutorial in anatomy during the COVID-19 pandemic.[18] Ours is a survey of perception of medical teachers of varying designations from various preclinical, paraclinical and clinical branches of a medical college affiliated to a university.

Misra *et al*.[7] used integrated services digital network (ISDN) technology for videoconferencing in the sub-specialty of neurology for discussion and training of doctors in the Indian state of Orissa. Furthermore, the study by Misra *et al*. did not report the perception of faculty and participants toward the telemedicine and tele-education technology.

Pradeep *et al*.[6] used services digital network (ISDN) technology followed by satellite-based technology for videoconference to train doctors in endocrine surgery. This paper mentioned that the confidence of the doctors at the remote site improved considerably after tele-education and telementoring, but there was no feedback reported from the participants and the faculty of the study.

Agrawal *et al*.[8] used ISDN technology for videoconferencing for education in the sub-specialty of radiation oncology. They got feedback from approximately six to eight participants at the user hospital. The report does not mention about the number of faculty members who gave the response to the feedback survey. The postgraduate trainee doctors felt that teleconferencing was useful in preparing for their exit examinations.

Velavan[9] described the experiences of a program in family medicine. The distance learning program involved both direct contact sessions and remote access using videoconference technology. Although the distance learning program was described to be having an impact on the general practitioners, there was no data given in the study regarding the feedback obtained from the participants and the faculty members. Our experience was based solely on the videoconference platform during the pandemic.

Parthasarathi *et al*.[19] described the use of Internet-based video conference technology for conducting a virtual live conference on laparoscopic and bariatric surgery. The study described the experience of the authors but had no data pertaining to the perception of the participants and the faculty members toward virtual videoconference.

Recently, Institutes have described their coping strategies of dealing with the challenges imposed on medical education by COVID-19 pandemic. Authors from the National University of Health, Singapore[20] have described steps taken to ensure continuity of the continuing medical education of various specialties, but the paper had no data regarding the perception of medical students and the faculty toward the newly adopted video conferencing facilities.

In India, there are multiple mobile service providers, and the speed and connectivity tend to vary both with the service provider and the type of the device being used to deliver an online lecture (IOS based or Android based). In India, Internet broadband, 3G and 4G mobile phone technology on smartphones and smart devices are easily available at an affordable rate. The use of satellite technology and ISDN technology is costly and requires special equipments that are expensive and cannot be afforded by all medical colleges in India. Also, both satellite and ISDN technologies need equipment at the host center and the remote center. Using satellite technology and ISDN technology would not have been an option during the COVID-19 pandemic as the congregation of medical students was not allowed during the lockdown period. All medical teachers and students had a smartphone or smart device with internet broadband connectivity, 3G or 4G mobile phone technology. Equipment used for telemedicine and tele-education are costly, and one study from a premier postgraduate training institute of India reported the cost to be approximately 11 Lakhs INR in the year 2001–2005.[6]

Situation for the medical teachers

The challenging situation posed due to the pandemic wherein faculty members were attending to duties had a demoralizing effect on the medical teachers with the possibility of consequent adverse implications on the teaching of the medical students.[21] Our institute adopted a faculty friendly approach wherein faculty members from the clinical departments were reporting to their duties on a rotational basis and rest of the faculty members were involved in teaching using videoconference platforms from their respective homes. This step aided the process of continuing medical education for the medical undergraduate students of the institute.

Discussion of our results

Our results concur with the observations made by Hammond *et al*.[22] wherein online teaching can act as a supplement to the traditional teaching methods, including clinical interaction with patients and online teaching modalities cannot replace traditional methods. Internet connectivity issues can hamper the conduct of online teaching. This was observed by teachers of our institute by 50 medical teachers (48.1%), and similar concern was expressed by other authors.[23] The perceived lack of punctuality of students by the medical teachers could possibly be attributed to internet connectivity issues faced by students themselves. Many students came from remote places of the state wherein genuine internet connectivity issues were reported. The preference of medical teachers of our institute to use Google meet could possibly be due to the capacity to admit 150 medical students in one single e-tutorial session, lack of set time limit, user-friendly nature of the video conference tool and capacity to share screen with participants. The free version of Zoom meet gives access to only 100 participants due to which the same faculty had to take two different lectures on the same topic for the entire batch of 150 students that was subdivided into two groups. Also, the free version of Zoom meet had a maximum time limit of 40 min due to which faculties had to end their session sooner, leaving little time for answering queries from students.

We would like to acknowledge the following limitations of our study. Our study consisted of a quantitative evaluation of the perception of medical teachers on a five-point Likert scale. Our study did not include qualitative evaluation using open-ended questions, and future studies could possibly evaluate the same. The five-point Likert scale has been used in many studies that were included in a systematic review[24] on the role of videoconference in education and training of physicians. All the studies in the systematic review included the perception of the beneficiaries of education except one study[25] that included the perception of four facilitators towards the use of videoconference.

Medical teachers had a positive perception toward video conference tools for teaching medical undergraduate students. Asking students to sign in using roll number

and names during Zoom meet and Google meet can help in taking their attendance during the e-tutorial.

It is unknown as to how long the social distancing measures will be mandatory; hence, online lectures remain as the main modality for delivering teaching to undergraduate medical students. Hence, it is vital that medical teachers become adept in using various videoconferencing tools for the benefit of the medical students. This unprecedented situation also yields opportunities for innovation in medical education and assessment of students.

Conclusions

The faculties had a positive perception toward digital education methods adopted for teaching of undergraduate medical students. Although many institutes are following the above methods, ours is the first study to present the perception of the medical faculty members towards online teaching methods. We encourage the use of Google Meet/Zoom meet and Google Classroom for medical education during the COVID-19 pandemic. These videoconferencing platforms can also be used as adjuncts to traditional classroom face to face teaching once the pandemic is over.

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Conflicts of interest

There are no conflicts of interest.

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